

SEQUENCE LISTING

<110> Malvar, Thomas  
Gilmer, Amy Jelen

<120> Antibodies Immunologically Reactive with Broad-Spectrum  
Delta-Endotoxins (Amended)

<130> 11792.0210.DVUS03 (MECO:210--4)

<150> US 10/365,645  
<151> 2003-02-12

<150> US 09/873,873  
<151> 2001-06-04

<150> US 09/253,341  
<151> 1999-02-19

<150> US 08/922,505  
<151> 1997-09-03

<150> US 08/754,490  
<151> 1996-11-20

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<170> PatentIn version 3.2

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1 5 10 15

48

agt aac cct gaa gta gaa gta tta ggt gga gaa aga ata gaa act ggt  
Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly  
20 25 30

96

tac acc cca atc gat att tcc ttg tcg cta acg caa ttt ctt ttg agt  
Tyr Thr Pro Ile Asp Ile Ser Leu Ser Thr Gln Phe Leu Leu Ser  
35 40 45

144

gaa ttt gtt ccc ggt gct gga ttt gtg tta gga cta gtt gat ata ata  
Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile  
50 55 60

192

tgg gga att ttt ggt ccc tct caa tgg gac gca ttt ctt gta caa att  
Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile  
65 70 75 80

240

gaa cag tta att aac caa aga ata gaa gaa ttc gct agg aac caa gcc  
Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala  
85 90 95

288

att tct aga tta gaa gga cta agc aat ctt tat caa att tac gca gaa  
Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu  
100 105 110

336

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Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu  
115 120 125

384

gag atg cgt att caa ttc aat gac atg aac agt gcc ctt aca acc gct  
Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala  
130 135 140

432

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tat gtt caa gct gca aat tta cat tta tca gtt ttg aga gat gtt tca Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser 165 170 175	528
gtg ttt gga caa agg tgg gga ttt gat gcc gcg act atc aat agt cgt Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg 180 185 190	576
tat aat gat tta act agg ctt att ggc aac tat aca gat tat gct gta Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val 195 200 205	624
cgc tgg tac aat acg gga tta gaa cgt gta tgg gga ccg gat tct aga Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg 210 215 220	672
gat tgg gta agg tat aat caa ttt aga aga gaa tta aca cta act gta Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val 225 230 235 240	720
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att cga aca gtt tcc caa tta aca aga gaa att tat aca aac cca gta Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val 260 265 270	816
tta gaa aat ttt gat ggt agt ttt cga ggc tcg gct cag ggc ata gaa Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu 275 280 285	864
aga agt att agg agt cca cat ttg atg gat ata ctt aac agt ata acc Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr 290 295 300	912
atc tat acg gat gct cat agg ggt tat tat tat tgg tca ggg cat caa Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Trp Ser Gly His Gln 305 310 315 320	960
ata atg gct tct cct gta ggg ttt tcg ggg cca gaa ttc act ttt ccg Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro 325 330 335	1008
cta tat gga act atg gga aat gca gct cca caa caa cgt att gtt gct Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala 340 345 350	1056
caa cta ggt cag ggc gtg tat aga aca tta tcg tcc act tta tat aga Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg 355 360 365	1104
aga cct ttt aat ata ggg ata aat aat caa caa cta tct gtt ctt gac	1152

Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp			
370	375	380	
ggg aca gaa ttt gct tat gga acc tcc tca aat ttg cca tcc gct gta			1200
Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val			
385	390	395	400
tac aga aaa agc gga acg gta gat tcg ctg gat gaa ata ccg cca cag			1248
Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln			
405	410	415	
aat aac aac gtg cca cct agg caa gga ttt agt cat cga tta agc cat			1296
Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His			
420	425	430	
gtt tca atg ttt cgt tca ggc ttt agt aat agt agt gta agt ata ata			1344
Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile			
435	440	445	
aga gct cca atg ttt tct tgg acg cac cgt agt gca acc cct aca aat			1392
Arg Ala Pro Met Phe Ser Trp Thr His Arg Ser Ala Thr Pro Thr Asn			
450	455	460	
aca att gat ccg gag agg att act caa ata cca ttg gta aaa gca cat			1440
Thr Ile Asp Pro Glu Arg Ile Thr Gln Ile Pro Leu Val Lys Ala His			
465	470	475	480
aca ctt cag tca ggt act act gtt gta aga ggg ccc ggg ttt acg gga			1488
Thr Leu Gln Ser Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly			
485	490	495	
gga gat att ctt cga cga aca agt gga gga cca ttt gct tat act att			1536
Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile			
500	505	510	
gtt aat ata aat ggg caa tta ccc caa agg tat cgt gca aga ata cgc			1584
Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg			
515	520	525	
tat gcc tct act aca aat cta aga att tac gta acg gtt gca ggt gaa			1632
Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu			
530	535	540	
cgg att ttt gct ggt caa ttt aac aaa aca atg gat acc ggt gac cca			1680
Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro			
545	550	555	560
tta aca ttc caa tct ttt agt tac gca act att aat aca gct ttt aca			1728
Leu Thr Phe Gln Ser Phe Ser Tyr Ala Thr Ile Asn Thr Ala Phe Thr			
565	570	575	
ttc cca atg agc cag agt agt ttc aca gta ggt gct gat act ttt agt			1776
Phe Pro Met Ser Gln Ser Ser Phe Thr Val Gly Ala Asp Thr Phe Ser			
580	585	590	
tca ggg aat gaa gtt tat ata gac aga ttt gaa ttg att cca gtt act			1824
Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr			
595	600	605	

gca aca ttt gaa gca gaa tat gat tta gaa aga gca caa aag gcg gtg Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val 610 615 620	1872
aat gcg ctg ttt act tct ata aac caa ata ggg ata aaa aca gat gtg Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val 625 630 635 640	1920
acg gat tat cat att gat caa gta tcc aat tta gtg gat tgt tta tca Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser 645 650 655	1968
gat gaa ttt tgt ctg gat gaa aag cga gaa ttg tcc gag aaa gtc aaa Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys 660 665 670	2016
cat gcg aag cga ctc agt gat gag cgg aat tta ctt caa gat cca aac His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn 675 680 685	2064
ttc aaa ggc atc aat agg caa cta gac cgt ggt tgg aga gga agt acg Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr 690 695 700	2112
gat att acc atc caa aga gga gat gac gta ttc aaa gaa aat tat gtc Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val 705 710 715 720	2160
aca cta cca ggt acc ttt gat gag tgc tat cca aca tat ttg tat caa Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln 725 730 735	2208
aaa atc gat gaa tca aaa tta aaa gcc ttt acc cgt tat caa tta aga Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg 740 745 750	2256
ggg tat atc gaa gat agt caa gac tta gaa atc tat tta att cgc tac Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr 755 760 765	2304
aat gca aaa cat gaa aca gta aat gtg cca ggt acg ggt tcc tta tgg Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp 770 775 780	2352
ccg ctt tca gcc caa agt cca atc gga aag tgt gga gag ccg aat cga Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg 785 790 795 800	2400
tgc gcg cca cac ctt gaa tgg aat cct gac tta gat tgt tcg tgt agg Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg 805 810 815	2448
gat gga gaa aag tgt gcc cat cat tcg cat cat ttc tcc tta gac att Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile 820 825 830	2496
gat gta gga tgt aca gac tta aat gag gac cta ggt gta tgg gtg atc	2544

Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile			
835	840	845	
ttt aag att aag acg caa gat ggg cac gca aga cta ggg aat cta gag			2592
Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu			
850	855	860	
ttt ctc gaa gag aaa cca tta gta gga gaa gcg cta gct cgt gtg aaa			2640
Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys			
865	870	875	880
aga gcg gag aaa aaa tgg aga gac aaa cgt gaa aaa ttg gaa tgg gaa			2688
Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu			
885	890	895	
aca aat atc gtt tat aaa gag gca aaa gaa tct gta gat gct tta ttt			2736
Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe			
900	905	910	
gta aac tct caa tat gat caa tta caa gcg gat acg aat att gcc atg			2784
Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met			
915	920	925	
att cat gcg gca gat aaa cgt gtt cat agc att cga gaa gct tat ctg			2832
Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu			
930	935	940	
cct gag ctg tct gtg att ccg ggt gtc aat gcg gct att ttt gaa gaa			2880
Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu			
945	950	955	960
tta gaa ggg cgt att ttc act gca ttc tcc cta tat gat gcg aga aat			2928
Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn			
965	970	975	
gtc att aaa aat ggt gat ttt aat aat ggc tta tcc tgc tgg aac gtg			2976
Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val			
980	985	990	
aaa ggg cat gta gat gta gaa gaa caa aac aac caa cgt tcg gtc ctt			3024
Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu			
995	1000	1005	
gtt gtt ccg gaa tgg gaa gca gaa gtg tca caa gaa gtt cgt gtc			3069
Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val			
1010	1015	1020	
tgt ccg ggt cgt ggc tat atc ctt cgt gtc aca gcg tac aag gag			3114
Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu			
1025	1030	1035	
gga tat gga gaa ggt tgc gta acc att cat gag atc gag aac aat			3159
Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn			
1040	1045	1050	
aca gac gaa ctg aag ttt agc aac tgc gta gaa gag gaa atc tat			3204
Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr			
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Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu	
1070 1075 1080	
gaa tac gga ggt gcg tac act tct cgt aat cga gga tat aac gaa	3294
Glu Tyr Gly Gly Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu	
1085 1090 1095	
gct cct tcc gta cca gct gat tat gcg tca gtc tat gaa gaa aaa	3339
Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys	
1100 1105 1110	
tcg tat aca gat gga cga aga gag aat cct tgt gaa ttt aac aga	3384
Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Phe Asn Arg	
1115 1120 1125	
ggg tat agg gat tac acg cca cta cca gtt ggt tat gtg aca aaa	3429
Gly Tyr Arg Asp Tyr Thr Pro Leu Pro Val Gly Tyr Val Thr Lys	
1130 1135 1140	
gaa tta gaa tac ttc cca gaa acc gat aag gta tgg att gag att	3474
Glu Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu Ile	
1145 1150 1155	
gga gaa acg gaa gga aca ttt atc gtg gac agc gtg gaa tta ctc	3519
Gly Glu Thr Glu Gly Thr Phe Ile Val Asp Ser Val Glu Leu Leu	
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Leu Met Glu Glu	
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Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser  
 35 40 45

Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile  
 50 55 60

Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile  
 65 70 75 80

Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala  
85 90 95

Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu  
100 105 110

Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu  
115 120 125

Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala  
130 135 140

Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val  
145 150 155 160

Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser  
165 170 175

Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg  
180 185 190

Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val  
195 200 205

Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg  
210 215 220

Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val  
225 230 235 240

Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro  
245 250 255

Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val  
260 265 270

Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu  
275 280 285

Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr  
290 295 300

Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln  
305 310 315 320

Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro  
325 330 335

Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala  
340 345 350

Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg  
355 360 365

Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp  
370 375 380

Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val  
385 390 395 400

Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln  
405 410 415

Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His  
420 425 430

Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile  
435 440 445

Arg Ala Pro Met Phe Ser Trp Thr His Arg Ser Ala Thr Pro Thr Asn  
450 455 460

Thr Ile Asp Pro Glu Arg Ile Thr Gln Ile Pro Leu Val Lys Ala His  
465 470 475 480

Thr Leu Gln Ser Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly  
485 490 495

Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile  
500 505 510

Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg  
515 520 525

Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu  
530 535 540

Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro  
545 550 555 560

Leu Thr Phe Gln Ser Phe Ser Tyr Ala Thr Ile Asn Thr Ala Phe Thr  
565 570 575

Phe Pro Met Ser Gln Ser Ser Phe Thr Val Gly Ala Asp Thr Phe Ser  
580 585 590

Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr  
595 600 605

Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val  
610 615 620

Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val  
625 630 635 640

Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser  
645 650 655

Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys  
660 665 670

His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn  
675 680 685

Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr

690	695	700	
Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val			
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Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln			
725	730	735	
Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg			
740	745	750	
Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr			
755	760	765	
Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp			
770	775	780	
Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg			
785	790	795	800
Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg			
805	810	815	
Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile			
820	825	830	
Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile			
835	840	845	
Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu			
850	855	860	
Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys			
865	870	875	880
Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu			
885	890	895	
Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe			
900	905	910	
Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met			
915	920	925	
Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu			
930	935	940	
Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu			
945	950	955	960
Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn			
965	970	975	
Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val			
980	985	990	
Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu			
995	1000	1005	

Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val  
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 Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu  
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 Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn  
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 Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr  
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 Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu  
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 Glu Tyr Gly Gly Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu  
 1085 1090 1095  
 Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys  
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 Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Phe Asn Arg  
 1115 1120 1125  
 Gly Tyr Arg Asp Tyr Thr Pro Leu Pro Val Gly Tyr Val Thr Lys  
 1130 1135 1140  
 Glu Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu Ile  
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agt aac cct gaa gta gaa gta tta ggt gga gaa aga ata gaa act ggt  
 Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly

48

96

	20	25	30	
tac acc cca atc gat att tcc ttg tcg cta acg caa ttt ctt ttg agt Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser	35	40	45	144
gaa ttt gtt ccc ggt gct gga ttt gtg tta gga cta gtt gat ata ata Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile	50	55	60	192
tgg gga att ttt ggt ccc tct caa tgg gac gca ttt ctt gta caa att Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile	65	70	75	240
gaa cag tta att aac caa aga ata gaa gaa ttc gct agg aac caa gcc Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala	85	90	95	288
att tct aga tta gaa gga cta agc aat ctt tat caa att tac gca gaa Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu	100	105	110	336
tct ttt aga gag tgg gaa gca gat cct act aat cca gca tta aga gaa Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu	115	120	125	384
gag atg cgt att caa ttc aat gac atg aac agt gcc ctt aca acc gct Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala	130	135	140	432
att cct ctt ttt gca gtt caa aat tat caa gtt cct ctt tta tca gta Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val	145	150	155	480
tat gtt caa gct gca aat tta cat tta tca gtt ttg aga gat gtt tca Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser	165	170	175	528
gtg ttt gga caa agg tgg gga ttt gat gcc gcg act atc aat agt cgt Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg	180	185	190	576
tat aat gat tta act agg ctt att ggc aac tat aca gat tat gct gta Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val	195	200	205	624
cgc tgg tac aat acg gga tta gaa cgt gta tgg gga ccg gat tct aga Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg	210	215	220	672
gat tgg gta agg tat aat caa ttt aga aga gaa tta aca cta act gta Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val	225	230	235	720
tta gat atc gtt gct ctg ttc ccg aat tat gat agt aga aga tat cca Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro	245	250	255	768

att cga aca gtt tcc caa tta aca aca gaa att tat aca aac cca gta Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val 260 265 270	816
tta gaa aat ttt gat ggt agt ttt cga ggc tcg gct cag ggc ata gaa Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu 275 280 285	864
aga agt att agg agt cca cat ttg atg gat ata ctt aac agt ata acc Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr 290 295 300	912
atc tat acg gat gct cat agg ggt tat tat tat tgg tca ggg cat caa Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln 305 310 315 320	960
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cta tat gga act atg gga aat gca gct cca caa cgt att gtt gct Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala 340 345 350	1056
caa cta ggt cag ggc gtg tat aga aca tta tcg tcc act tta tat aga Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg 355 360 365	1104
aga cct ttt aat ata ggg ata aat aat caa caa cta tct gtt ctt gac Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp 370 375 380	1152
ggg aca gaa ttt gct tat gga acc tcc tca aat ttg cca tcc gct gta Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val 385 390 395 400	1200
tac aga aaa agc gga acg gta gat tcg ctg gat gaa ata ccg cca cag Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln 405 410 415	1248
aat aac aac gtg cca cct agg caa gga ttt agt cat cga tta agc cat Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His 420 425 430	1296
gtt tca atg ttt cgt tca ggc ttt agt aat agt agt gta agt ata ata Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile 435 440 445	1344
aga gct cca atg ttt tct tgg acg cac cgt agt gca acc cct aca aat Arg Ala Pro Met Phe Ser Trp Thr His Arg Ser Ala Thr Pro Thr Asn 450 455 460	1392
aca att gat ccg gag agg att act caa ata cca ttg gta aaa gca cat Thr Ile Asp Pro Glu Arg Ile Thr Gln Ile Pro Leu Val Lys Ala His 465 470 475 480	1440
aca ctt cag tca ggt act act gtt gta aga ggg ccc ggg ttt acg gga Thr Leu Gln Ser Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly	1488

485	490	495	
gga gat att ctt cga cga aca agt gga gga cca ttt gct tat act att Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile 500	505	510	1536
gtt aat ata aat ggg caa tta ccc caa agg tat cgt gca aga ata cgc Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg 515	520	525	1584
tat gcc tct act aca aat cta aga att tac gta acg gtt gca ggt gaa Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu 530	535	540	1632
cgg att ttt gct ggt caa ttt aac aaa aca atg gat acc ggt gac cca Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro 545	550	555	1680
tta aca ttc caa tct ttt agt tac gca act att aat aca gct ttt aca Leu Thr Phe Gln Ser Phe Ser Tyr Ala Thr Ile Asn Thr Ala Phe Thr 565	570	575	1728
ttc cca atg agc cag agt agt ttc aca gta ggt gct gat act ttt agt Phe Pro Met Ser Gln Ser Phe Thr Val Gly Ala Asp Thr Phe Ser 580	585	590	1776
tca ggg aat gaa gtt tat ata gac aga ttt gaa ttg att cca gtt act Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr 595	600	605	1824
gca aca ttt gaa gca gaa tat gat tta gaa aga gca caa aag gcg gtg Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val 610	615	620	1872
aat gcg ctg ttt act tct ata aac caa ata ggg ata aaa aca gat gtg Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val 625	630	635	1920
acg gat tat cat att gat caa gta tcc aat tta gtg gat tgt tta tca Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser 645	650	655	1968
gat gaa ttt tgt ctg gat gaa aag cga gaa ttg tcc gag aaa gtc aaa Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Val Lys 660	665	670	2016
cat gcg aag cga ctc agt gat gag cgg aat tta ctt caa gat cca aac His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn 675	680	685	2064
ttc aaa ggc atc aat agg caa cta gac cgt ggt tgg aga gga agt acg Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr 690	695	700	2112
gat att acc atc caa aga gga gat gac gta ttc aaa gaa aat tat gtc Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val 705	710	715	2160
		720	

aca cta cca ggt acc ttt gat gag tgc tat cca aca tat ttg tat caa Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln 725 730 735	2208
aaa atc gat gaa tca aaa tta aaa gcc ttt acc cgt tat caa tta aga Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg 740 745 750	2256
ggg tat atc gaa gat agt caa gac tta gaa atc tat tta att cgc tac Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr 755 760 765	2304
aat gca aaa cat gaa aca gta aat gtg cca ggt acg ggt tcc tta tgg Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp 770 775 780	2352
ccg ctt tca gcc caa agt cca atc gga aag tgt gga gag ccg aat cga Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg 785 790 795 800	2400
tgc gcg cca cac ctt gaa tgg aat cct gac tta gat tgt tcg tgt agg Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg 805 810 815	2448
gat gga gaa aag tgt gcc cat cat tcg cat cat ttc tcc tta gac att Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile 820 825 830	2496
gat gta gga tgt aca gac tta aat gag gac cta ggt gta tgg gtg atc Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile 835 840 845	2544
ttt aag att aag acg caa gat ggg cac gca aga cta ggg aat cta gag Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu 850 855 860	2592
ttt ctc gaa gag aaa cca tta gta gga gaa gcg cta gct cgt gtg aaa Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys 865 870 875 880	2640
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aca aat atc gtt tat aaa gag gca aaa gaa tct gta gat gct tta ttt Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe 900 905 910	2736
gta aac tct caa tat gat caa tta caa gcg gat acg aat att gcc atg Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met 915 920 925	2784
att cat gcg gca gat aaa cgt gtt cat agc att cga gaa gct tat ctg Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu 930 935 940	2832
cct gag ctg tct gtg att ccg ggt gtc aat gcg gct att ttt gaa gaa Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu	2880

945	950	955	960	
tta gaa ggg cgt att ttc act gca ttc tcc cta tat gat gcg aga aat				2928
Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn				
965	970	975		
gtc att aaa aat ggt gat ttt aat aat ggc tta tcc tgc tgg aac gtg				2976
Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val				
980	985	990		
aaa ggg cat gta gat gta gaa gaa caa aac aac caa cgt tcg gtc ctt				3024
Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu				
995	1000	1005		
gtt gtt ccg gaa tgg gaa gca gaa gtg tca caa gaa gtt cgt gtc				3069
Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val				
1010	1015	1020		
tgt ccg ggt cgt ggc tat atc ctt cgt gtc aca gcg tac aag gag				3114
Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu				
1025	1030	1035		
gga tat gga gaa ggt tgc gta acc att cat gag atc gag aac aat				3159
Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn				
1040	1045	1050		
aca gac gaa ctg aag ttt agc aac tgc gta gaa gag gaa atc tat				3204
Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr				
1055	1060	1065		
cca aat aac acg gta acg tgt aat gat tat act gta aat caa gaa				3249
Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu				
1070	1075	1080		
gaa tac gga ggt gcg tac act tct cgt aat cga gga tat aac gaa				3294
Glu Tyr Gly Gly Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu				
1085	1090	1095		
gct cct tcc gta cca gct gat tat gcg tca gtc tat gaa gaa aaa				3339
Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys				
1100	1105	1110		
tcg tat aca gat gga cga aga gag aat cct tgt gaa ttt aac aga				3384
Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Phe Asn Arg				
1115	1120	1125		
ggg tat agg gat tac acg cca cta cca gtt ggt tat gtg aca aaa				3429
Gly Tyr Arg Asp Tyr Thr Pro Leu Pro Val Gly Tyr Val Thr Lys				
1130	1135	1140		
gaa tta gaa tac ttc cca gaa acc gat aag gta tgg att gag att				3474
Glu Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu Ile				
1145	1150	1155		
gga gaa acg gaa gga aca ttt atc gtg gac agc gtg gaa tta ctc				3519
Gly Glu Thr Glu Gly Thr Phe Ile Val Asp Ser Val Glu Leu Leu				
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ctt atg gag gaa 3531  
Leu Met Glu Glu  
1175

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<220>  
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Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser  
35 40 45

Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile  
50 55 60

Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile  
65 70 75 80

Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala  
85 90 95

Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu  
100 105 110

Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu  
115 120 125

Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala  
130 135 140

Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val  
145 150 155 160

Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser  
165 170 175

Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg  
180 185 190

Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val  
195 200 205

Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg  
210 215 220

Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val

225	230	235	240
Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro			
245	250	255	
Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val			
260	265	270	
Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu			
275	280	285	
Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr			
290	295	300	
Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln			
305	310	315	320
Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro			
325	330	335	
Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala			
340	345	350	
Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg			
355	360	365	
Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp			
370	375	380	
Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val			
385	390	395	400
Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln			
405	410	415	
Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His			
420	425	430	
Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile			
435	440	445	
Arg Ala Pro Met Phe Ser Trp Thr His Arg Ser Ala Thr Pro Thr Asn			
450	455	460	
Thr Ile Asp Pro Glu Arg Ile Thr Gln Ile Pro Leu Val Lys Ala His			
465	470	475	480
Thr Leu Gln Ser Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly			
485	490	495	
Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile			
500	505	510	
Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg			
515	520	525	
Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu			
530	535	540	

Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro  
 545 550 555 560  
 Leu Thr Phe Gln Ser Phe Ser Tyr Ala Thr Ile Asn Thr Ala Phe Thr  
 565 570 575  
 Phe Pro Met Ser Gln Ser Ser Phe Thr Val Gly Ala Asp Thr Phe Ser  
 580 585 590  
 Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr  
 595 600 605  
 Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val  
 610 615 620  
 Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val  
 625 630 635 640  
 Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser  
 645 650 655  
 Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys  
 660 665 670  
 His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn  
 675 680 685  
 Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr  
 690 695 700  
 Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val  
 705 710 715 720  
 Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln  
 725 730 735  
 Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg  
 740 745 750  
 Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr  
 755 760 765  
 Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp  
 770 775 780  
 Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg  
 785 790 795 800  
 Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg  
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 Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile  
 820 825 830  
 Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile  
 835 840 845

Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu  
850 855 860

Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys  
865 870 875 880

Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu  
885 890 895

Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe  
900 905 910

Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met  
915 920 925

Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu  
930 935 940

Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu  
945 950 955 960

Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn  
965 970 975

Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val  
980 985 990

Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu  
995 1000 1005

Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val  
1010 1015 1020

Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu  
1025 1030 1035

Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn  
1040 1045 1050

Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr  
1055 1060 1065

Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu  
1070 1075 1080

Glu Tyr Gly Gly Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu  
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Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys  
1100 1105 1110

Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Phe Asn Arg  
1115 1120 1125

Gly Tyr Arg Asp Tyr Thr Pro Leu Pro Val Gly Tyr Val Thr Lys  
1130 1135 1140

Glu Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu Ile

1145	1150	1155														
Gly	Glu	Thr	Glu	Gly	Thr	Phe	Ile	Val	Asp	Ser	Val	Glu	Leu	Leu		
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Met	Asp	Asn	Asn	Pro	Asn	Ile	Asn	Glu	Cys	Ile	Pro	Tyr	Asn	Cys	Leu	
1				5						10				15		
agt	aac	cct	gaa	gta	gaa	gta	tta	ggt	gga	gaa	aga	ata	gaa	act	ggt	96
Ser	Asn	Pro	Glu	Val	Glu	Val	Leu	Gly	Gly	Glu	Arg	Ile	Glu	Thr	Gly	
				20					25				30			
tac	acc	cca	atc	gat	att	tcc	ttg	tcg	cta	acg	caa	ttt	ctt	ttg	agt	144
Tyr	Thr	Pro	Ile	Asp	Ile	Ser	Leu	Ser	Leu	Thr	Gln	Phe	Leu	Leu	Ser	
				35			40			45						
gaa	ttt	gtt	ccc	ggt	gct	gga	ttt	gtg	tta	gga	cta	gtt	gat	ata	ata	192
Glu	Phe	Val	Pro	Gly	Ala	Gly	Phe	Val	Leu	Gly	Leu	Val	Asp	Ile	Ile	
				50			55			60						
tgg	gga	att	ttt	ggt	ccc	tct	caa	tgg	gac	gca	ttt	ctt	gta	caa	att	240
Trp	Gly	Ile	Phe	Gly	Pro	Ser	Gln	Trp	Asp	Ala	Phe	Leu	Val	Gln	Ile	
				65			70		75		80					
gaa	cag	tta	att	aac	caa	aga	ata	gaa	ttc	gct	agg	aac	caa	gcc		288
Glu	Gln	Leu	Ile	Asn	Gln	Arg	Ile	Glu	Glu	Phe	Ala	Arg	Asn	Gln	Ala	
				85			90			95						
att	tct	aga	tta	gaa	gga	cta	agc	aat	ctt	tat	caa	att	tac	gca	gaa	336
Ile	Ser	Arg	Leu	Glu	Gly	Leu	Ser	Asn	Leu	Tyr	Gln	Ile	Tyr	Ala	Glu	
				100			105			110						
tct	ttt	aga	gag	tgg	gaa	gca	gat	cct	act	aat	cca	gca	tta	aga	gaa	384
Ser	Phe	Arg	Glu	Trp	Glu	Ala	Asp	Pro	Thr	Asn	Pro	Ala	Leu	Arg	Glu	
				115			120			125						
gag	atg	cgt	att	caa	ttc	aat	gac	atg	aac	agt	gcc	ctt	aca	acc	gct	432
Glu	Met	Arg	Ile	Gln	Phe	Asn	Asp	Met	Asn	Ser	Ala	Leu	Thr	Thr	Ala	
				130			135			140						

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tat gtt caa gct gca aat tta cat tta tca gtt ttg aga gat gtt tca Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser 165 170 175	528
gtg ttt gga caa agg tgg gga ttt gat gcc gcg act atc aat agt cgt Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg 180 185 190	576
tat aat gat tta act agg ctt att ggc aac tat aca gat tat gct gta Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val 195 200 205	624
cgc tgg tac aat acg gga tta gaa cgt gta tgg gga ccg gat tct aga Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg 210 215 220	672
gat tgg gta agg tat aat caa ttt aga aga gaa tta aca cta act gta Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val 225 230 235 240	720
tta gat atc gtt gct ctg ttc ccg aat tat gat agt aga aga tat cca Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro 245 250 255	768
att cga aca gtt tcc caa tta aca aga gaa att tat aca aac cca gta Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val 260 265 270	816
tta gaa aat ttt gat ggt agt ttt cga ggc tcg gct cag ggc ata gaa Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu 275 280 285	864
aga agt att agg agt cca cat ttg atg gat ata ctt aac agt ata acc Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr 290 295 300	912
atc tat acg gat gct cat agg ggt tat tat tat tgg tca ggg cat caa Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Trp Ser Gly His Gln 305 310 315 320	960
ata atg gct tct cct gta ggg ttt tcg ggg cca gaa ttc act ttt ccg Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro 325 330 335	1008
cta tat gga act atg gga aat gca gct cca caa cgt att gtt gct Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala 340 345 350	1056
caa cta ggt cag ggc gtg tat aga aca tta tcg tcc act tta tat aga Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg 355 360 365	1104
aga cct ttt aat ata ggg ata aat aat caa caa cta tct gtt ctt gac	1152

Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp			
370	375	380	
ggg aca gaa ttt gct tat gga acc tcc tca aat ttg cca tcc gct gta			1200
Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val			
385	390	395	400
tac aga aaa agc gga acg gta gat tcg ctg gat gaa ata ccg cca cag			1248
Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln			
405	410	415	
aat aac aac gtg cca cct agg caa gga ttt agt cat cga tta agc cat			1296
Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His			
420	425	430	
gtt tca atg ttt cgt tca ggc ttt agt aat agt agt gta agt ata ata			1344
Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile			
435	440	445	
aga gct cca atg ttt tct tgg acg cac cgt agt gca acc cct aca aat			1392
Arg Ala Pro Met Phe Ser Trp Thr His Arg Ser Ala Thr Pro Thr Asn			
450	455	460	
aca att gat ccg gag agg att act caa ata cca ttg gta aaa gca cat			1440
Thr Ile Asp Pro Glu Arg Ile Thr Gln Ile Pro Leu Val Lys Ala His			
465	470	475	480
aca ctt cag tca ggt act act gtt gta aga ggg ccc ggg ttt acg gga			1488
Thr Leu Gln Ser Gly Thr Val Val Arg Gly Pro Gly Phe Thr Gly			
485	490	495	
gga gat att ctt cga cga aca agt gga gga cca ttt gct tat act att			1536
Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile			
500	505	510	
gtt aat ata aat ggg caa tta ccc caa agg tat cgt gca aga ata cgc			1584
Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg			
515	520	525	
tat gcc tct act aca aat cta aga att tac gta acg gtt gca ggt gaa			1632
Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu			
530	535	540	
cgg att ttt gct ggt caa ttt aac aaa aca atg gat acc ggt gac cca			1680
Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro			
545	550	555	560
tta aca ttc caa tct ttt agt tac gca act att aat aca gct ttt aca			1728
Leu Thr Phe Gln Ser Phe Ser Tyr Ala Thr Ile Asn Thr Ala Phe Thr			
565	570	575	
ttc cca atg agc cag agt agt ttc aca gta ggt gct gat act ttt agt			1776
Phe Pro Met Ser Gln Ser Ser Phe Thr Val Gly Ala Asp Thr Phe Ser			
580	585	590	
tca ggg aat gaa gtt tat ata gac aga ttt gaa ttg att cca gtt act			1824
Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr			
595	600	605	

gca aca ttt gaa gca gaa tat gat tta gaa aga gca caa aag gcg gtg Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val 610 615 620	1872
aat gcg ctg ttt act tct ata aac caa ata ggg ata aaa aca gat gtg Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val 625 630 635 640	1920
acg gat tat cat att gat caa gta tcc aat tta gtg gat tgt tta tca Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser 645 650 655	1968
gat gaa ttt tgt ctg gat gaa aag cga gaa ttg tcc gag aaa gtc aaa Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys 660 665 670	2016
cat gcg aag cga ctc agt gat gag cggt aat tta ctt caa gat cca aac His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn 675 680 685	2064
ttc aaa ggc atc aat agg caa cta gac cgt ggt tgg aga gga agt acg Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr 690 695 700	2112
gat att acc atc caa aga gga gat gac gta ttc aaa gaa aat tat gtc Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val 705 710 715 720	2160
aca cta cca ggt acc ttt gat gag tgc tat cca aca tat ttg tat caa Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln 725 730 735	2208
aaa atc gat gaa tca aaa tta aaa gcc ttt acc cgt tat caa tta aga Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg 740 745 750	2256
ggg tat atc gaa gat agt caa gac tta gaa atc tat tta att cgc tac Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr 755 760 765	2304
aat gca aaa cat gaa aca gta aat gtg cca ggt acg ggt tcc tta tgg Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp 770 775 780	2352
ccg ctt tca gcc caa agt cca atc gga aag tgt gga gag ccg aat cga Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg 785 790 795 800	2400
tgc gcg cca cac ctt gaa tgg aat cct gac tta gat tgt tcg tgt agg Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg 805 810 815	2448
gat gga gaa aag tgt gcc cat cat tcg cat cat ttc tcc tta gac att Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile 820 825 830	2496
gat gta gga tgt aca gac tta aat gag gac cta ggt gta tgg gtg atc	2544

Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile			
835	840	845	
ttt aag att aag acg caa gat ggg cac gca aga cta ggg aat cta gag			2592
Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu			
850	855	860	
ttt ctc gaa gag aaa cca tta gta gga gaa gcg cta gct cgt gtg aaa			2640
Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys			
865	870	875	880
aga gcg gag aaa aaa tgg aga gac aaa cgt gaa aaa ttg gaa tgg gaa			2688
Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu			
885	890	895	
aca aat atc gtt tat aaa gag gca aaa gaa tct gta gat gct tta ttt			2736
Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe			
900	905	910	
gta aac tct caa tat gat caa tta caa gcg gat acg aat att gcc atg			2784
Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met			
915	920	925	
att cat gcg gca gat aaa cgt gtt cat agc att cga gaa gct tat ctg			2832
Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu			
930	935	940	
cct gag ctg tct gtg att ccg ggt gtc aat gcg gct att ttt gaa gaa			2880
Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu			
945	950	955	960
tta gaa ggg cgt att ttc act gca ttc tcc cta tat gat gcg aga aat			2928
Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn			
965	970	975	
gtc att aaa aat ggt gat ttt aat aat ggc tta tcc tgc tgg aac gtg			2976
Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val			
980	985	990	
aaa ggg cat gta gat gta gaa gaa caa aac aac caa cgt tcg gtc ctt			3024
Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu			
995	1000	1005	
gtt gtt ccg gaa tgg gaa gca gaa gtg tca caa gaa gtt cgt gtc			3069
Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val			
1010	1015	1020	
tgt ccg ggt cgt ggc tat atc ctt cgt gtc aca gcg tac aag gag			3114
Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu			
1025	1030	1035	
gga tat gga gaa ggt tgc gta acc att cat gag atc gag aac aat			3159
Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn			
1040	1045	1050	
aca gac gaa ctg aag ttt agc aac tgc gta gaa gag gaa atc tat			3204
Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr			
1055	1060	1065	

cca aat aac acg gta acg tgt aat gat tat act gta aat caa gaa	3249
Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu	
1070 1075 1080	
gaa tac gga ggt gcg tac act tct cgt aat cga gga tat aac gaa	3294
Glu Tyr Gly Gly Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu	
1085 1090 1095	
gct cct tcc gta cca gct gat tat gcg tca gtc tat gaa gaa aaa	3339
Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys	
1100 1105 1110	
tcg tat aca gat gga cga aga gag aat cct tgt gaa ttt aac aga	3384
Ser Tyr Thr Asp Gly Arg Glu Asn Pro Cys Glu Phe Asn Arg	
1115 1120 1125	
ggg tat agg gat tac acg cca cta cca gtt ggt tat gtg aca aaa	3429
Gly Tyr Arg Asp Tyr Thr Pro Leu Pro Val Gly Tyr Val Thr Lys	
1130 1135 1140	
gaa tta gaa tac ttc cca gaa acc gat aag gta tgg att gag att	3474
Glu Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu Ile	
1145 1150 1155	
gga gaa acg gaa gga aca ttt atc gtg gac agc gtg gaa tta ctc	3519
Gly Glu Thr Glu Gly Thr Phe Ile Val Asp Ser Val Glu Leu Leu	
1160 1165 1170	
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Leu Met Glu Glu	
1175	

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 <212> PRT  
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<220>  
 <223> Hybrid Delta-Endotoxin

<400> 14

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Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly	
20 25 30	
Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser	
35 40 45	
Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile	
50 55 60	
Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile	
65 70 75 80	

Glu	Gln	Leu	Ile	Asn	Gln	Arg	Ile	Glu	Glu	Phe	Ala	Arg	Asn	Gln	Ala
85								90						95	
Ile	Ser	Arg	Leu	Glu	Gly	Leu	Ser	Asn	Leu	Tyr	Gln	Ile	Tyr	Ala	Glu
100								105					110		
Ser	Phe	Arg	Glu	Trp	Glu	Ala	Asp	Pro	Thr	Asn	Pro	Ala	Leu	Arg	Glu
115							120					125			
Glu	Met	Arg	Ile	Gln	Phe	Asn	Asp	Met	Asn	Ser	Ala	Leu	Thr	Thr	Ala
130								135				140			
Ile	Pro	Leu	Phe	Ala	Val	Gln	Asn	Tyr	Gln	Val	Pro	Leu	Leu	Ser	Val
145							150				155		160		
Tyr	Val	Gln	Ala	Ala	Asn	Leu	His	Leu	Ser	Val	Leu	Arg	Asp	Val	Ser
							165			170			175		
Val	Phe	Gly	Gln	Arg	Trp	Gly	Phe	Asp	Ala	Ala	Thr	Ile	Asn	Ser	Arg
							180			185			190		
Tyr	Asn	Asp	Leu	Thr	Arg	Leu	Ile	Gly	Asn	Tyr	Thr	Asp	Tyr	Ala	Val
							195			200			205		
Arg	Trp	Tyr	Asn	Thr	Gly	Leu	Glu	Arg	Val	Trp	Gly	Pro	Asp	Ser	Arg
							210			215			220		
Asp	Trp	Val	Arg	Tyr	Asn	Gln	Phe	Arg	Arg	Glu	Leu	Thr	Leu	Thr	Val
							225			230			235		240
Leu	Asp	Ile	Val	Ala	Leu	Phe	Pro	Asn	Tyr	Asp	Ser	Arg	Arg	Tyr	Pro
							245			250			255		
Ile	Arg	Thr	Val	Ser	Gln	Leu	Thr	Arg	Glu	Ile	Tyr	Thr	Asn	Pro	Val
							260			265			270		
Leu	Glu	Asn	Phe	Asp	Gly	Ser	Phe	Arg	Gly	Ser	Ala	Gln	Gly	Ile	Glu
							275			280			285		
Arg	Ser	Ile	Arg	Ser	Pro	His	Leu	Met	Asp	Ile	Leu	Asn	Ser	Ile	Thr
							290			295			300		
Ile	Tyr	Thr	Asp	Ala	His	Arg	Gly	Tyr	Tyr	Tyr	Trp	Ser	Gly	His	Gln
							305			310			315		320
Ile	Met	Ala	Ser	Pro	Val	Gly	Phe	Ser	Gly	Pro	Glu	Phe	Thr	Phe	Pro
							325			330			335		
Leu	Tyr	Gly	Thr	Met	Gly	Asn	Ala	Ala	Pro	Gln	Gln	Arg	Ile	Val	Ala
							340			345			350		
Gln	Leu	Gly	Gln	Gly	Val	Tyr	Arg	Thr	Leu	Ser	Ser	Thr	Leu	Tyr	Arg
							355			360			365		
Arg	Pro	Phe	Asn	Ile	Gly	Ile	Asn	Asn	Gln	Gln	Leu	Ser	Val	Leu	Asp
							370			375			380		

Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val  
 385 390 395 400  
 Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln  
 405 410 415  
 Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His  
 420 425 430  
 Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile  
 435 440 445  
 Arg Ala Pro Met Phe Ser Trp Thr His Arg Ser Ala Thr Pro Thr Asn  
 450 455 460  
 Thr Ile Asp Pro Glu Arg Ile Thr Gln Ile Pro Leu Val Lys Ala His  
 465 470 475 480  
 Thr Leu Gln Ser Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly  
 485 490 495  
 Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile  
 500 505 510  
 Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg  
 515 520 525  
 Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu  
 530 535 540  
 Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro  
 545 550 555 560  
 Leu Thr Phe Gln Ser Phe Ser Tyr Ala Thr Ile Asn Thr Ala Phe Thr  
 565 570 575  
 Phe Pro Met Ser Gln Ser Ser Phe Thr Val Gly Ala Asp Thr Phe Ser  
 580 585 590  
 Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr  
 595 600 605  
 Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val  
 610 615 620  
 Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val  
 625 630 635 640  
 Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser  
 645 650 655  
 Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys  
 660 665 670  
 His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn  
 675 680 685  
 Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr

690	695	700	
Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val			
705	710	715	720
Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln			
725	730	735	
Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg			
740	745	750	
Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr			
755	760	765	
Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr .Gly Ser Leu Trp			
770	775	780	
Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg			
785	790	795	800
Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg			
805	810	815	
Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile			
820	825	830	
Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile			
835	840	845	
Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu			
850	855	860	
Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys			
865	870	875	880
Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu			
885	890	895	
Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe			
900	905	910	
Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met			
915	920	925	
Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu			
930	935	940	
Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu			
945	950	955	960
Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn			
965	970	975	
Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val			
980	985	990	
Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu			
995	1000	1005	

Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val  
1010 1015 1020

Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu  
1025 1030 1035

Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn  
1040 1045 1050

Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr  
1055 1060 1065

Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu  
1070 1075 1080

Glu Tyr Gly Gly Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu  
1085 1090 1095

Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys  
1100 1105 1110

Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Phe Asn Arg  
1115 1120 1125

Gly Tyr Arg Asp Tyr Thr Pro Leu Pro Val Gly Tyr Val Thr Lys  
1130 1135 1140

Glu Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu Ile  
1145 1150 1155

Gly Glu Thr Glu Gly Thr Phe Ile Val Asp Ser Val Glu Leu Leu  
1160 1165 1170

Leu Met Glu Glu  
1175

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<400> 21

actaccaggt acctttgatg

20

<210> 22

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18

<210> 24

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<223> Synthetic Oligonucleotide

<400> 24

attactcaaa taccattgg

19

<210> 25

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48

1	5	10	15	
agt aac cct gaa gta gaa gta tta ggt gga gaa aga ata gaa act ggt				96
Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly				
20	25	30		
tac acc cca atc gat att tcc ttg tcg cta acg caa ttt ctt ttg agt				144
Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser				
35	40	45		
gaa ttt gtt ccc ggt gct gga ttt gtg tta gga cta gtt gat ata ata				192
Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile				
50	55	60		
tgg gga att ttt ggt ccc tct caa tgg gac gca ttt ctt gta caa att				240
Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile				
65	70	75	80	
gaa cag tta att aac caa aga ata gaa gaa ttc gct agg aac caa gcc				288
Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala				
85	90	95		
att tct aga tta gaa gga cta agc aat ctt tat caa att tac gca gaa				336
Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu				
100	105	110		
tct ttt aga gag tgg gaa gca gat cct act aat cca gca tta aga gaa				384
Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu				
115	120	125		
gag atg cgt att caa ttc aat gac atg aac agt gcc ctt aca acc gct				432
Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala				
130	135	140		
att cct ctt ttt gca gtt caa aat tat caa gtt cct ctt tta tca gta				480
Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val				
145	150	155	160	
tat gtt caa gct gca aat tta cat tta tca gtt ttg aga gat gtt tca				528
Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser				
165	170	175		
gtg ttt gga caa agg tgg gga ttt gat gcc gcg act atc aat agt cgt				576
Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg				
180	185	190		
tat aat gat tta act agg ctt att ggc aac tat aca gat cat gct gta				624
Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp His Ala Val				
195	200	205		
cgc tgg tac aat acg gga tta gag cgt gta tgg gga ccg gat tct aga				672
Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg				
210	215	220		
gat tgg ata aga tat aat caa ttt aga aga gaa tta aca cta act gta				720
Asp Trp Ile Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val				
225	230	235	240	

tta gat atc gtt tct cta ttt ccg aac tat gat agt aga acg tat cca Leu Asp Ile Val Ser Leu Phe Pro Asn Tyr Asp Ser Arg Thr Tyr Pro 245 250 255	768
att cga aca gtt tcc caa tta aca aga gaa att tat aca aac cca gta Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val 260 265 270	816
tta gaa aat ttt gat ggt agt ttt cga ggc tcg gct cag ggc ata gaa Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu 275 280 285	864
aga agt att agg agt cca cat ttg atg gat ata ctt aac agt ata acc Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr 290 295 300	912
atc tat acg gat gct cat agg ggt tat tat tat tgg tca ggg cat caa Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln 305 310 315 320	960
ata atg gct tct cct gta ggg ttt tcg ggg cca gaa ttc act ttt ccg Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro 325 330 335	1008
cta tat gga act atg gga aat gca gct cca caa caa cgt att gtt gct Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala 340 345 350	1056
caa cta ggt cag ggc gtg tat aga aca tta tcg tcc act tta tat aga Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg 355 360 365	1104
aga cct ttt aat ata ggg ata aat aat caa caa cta tct gtt ctt gac Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp 370 375 380	1152
ggg aca gaa ttt gct tat gga acc tcc tca aat ttg cca tcc gct gta Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val 385 390 395 400	1200
tac aga aaa agc gga acg gta gat tcg ctg gat gaa ata ccg cca cag Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln 405 410 415	1248
aat aac aac gtg cca cct agg caa gga ttt agt cat cga tta agc cat Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His 420 425 430	1296
gtt tca atg ttt cgt tca ggc ttt agt aat agt agt gta agt ata ata Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile 435 440 445	1344
aga gct cca atg ttt tct tgg acg cac cgt agt gca acc cct aca aat Arg Ala Pro Met Phe Ser Trp Thr His Arg Ser Ala Thr Pro Thr Asn 450 455 460	1392
aca att gat ccg gag agg att act caa ata cca ttg gta aaa gca cat Thr Ile Asp Pro Glu Arg Ile Thr Gln Ile Pro Leu Val Lys Ala His	1440

465	470	475	480	
aca ctt cag tca ggt act act gtt gta aga ggg ccc ggg ttt acg gga				1488
Thr Leu Gln Ser Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly				
485	490	495		
gga gat att ctt cga cga aca agt gga gga cca ttt gct tat act att				1536
Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile				
500	505	510		
gtt aat ata aat ggg caa tta ccc caa agg tat cgt gca aga ata cgc				1584
Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg				
515	520	525		
tat gcc tct act aca aat cta aga att tac gta acg gtt gca ggt gaa				1632
Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu				
530	535	540		
cgg att ttt gct ggt caa ttt aac aaa aca atg gat acc ggt gac cca				1680
Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro				
545	550	555	560	
tta aca ttc caa tct ttt agt tac gca act att aat aca gct ttt aca				1728
Leu Thr Phe Gln Ser Phe Ser Tyr Ala Thr Ile Asn Thr Ala Phe Thr				
565	570	575		
ttc cca atg agc cag agt agt ttc aca gta ggt gct gat act ttt agt				1776
Phe Pro Met Ser Gln Ser Phe Thr Val Gly Ala Asp Thr Phe Ser				
580	585	590		
tca ggg aat gaa gtt tat ata gac aga ttt gaa ttg att cca gtt act				1824
Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr				
595	600	605		
gca aca ttt gaa gca gaa tat gat tta gaa aga gca caa aag gcg gtg				1872
Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val				
610	615	620		
aat gcg ctg ttt act tct ata aac caa ata ggg ata aaa aca gat gtg				1920
Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val				
625	630	635	640	
acg gat tat cat att gat caa gta tcc aat tta gtg gat tgt tta tca				1968
Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser				
645	650	655		
gat gaa ttt tgt ctg gat gaa aag cga gaa ttg tcc gag aaa gtc aaa				2016
Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys				
660	665	670		
cat gcg aag cga ctc agt gat gag cgg aat tta ctt caa gat cca aac				2064
His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn				
675	680	685		
ttc aaa ggc atc aat agg caa cta gac cgt ggt tgg aga gga agt acg				2112
Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr				
690	695	700		

gat att acc atc caa aga gga gat gac gta ttc aaa gaa aat tat gtc Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val 705 710 715 720	2160
aca cta cca ggt acc ttt gat gag tgc tat cca aca tat ttg tat caa Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln 725 730 735	2208
aaa atc gat gaa tca aaa tta aaa gcc ttt acc cgt tat caa tta aga Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg 740 745 750	2256
ggg tat atc gaa gat agt caa gac tta gaa atc tat tta att cgc tac Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr 755 760 765	2304
aat gca aaa cat gaa aca gta aat gtg cca ggt acg ggt tcc tta tgg Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp 770 775 780	2352
ccg ctt tca gcc caa agt cca atc gga aag tgt gga gag ccg aat cga Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg 785 790 795 800	2400
tgc gcg cca cac ctt gaa tgg aat cct gac tta gat tgt tcg tgt agg Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg 805 810 815	2448
gat gga gaa aag tgt gcc cat cat tcg cat cat ttc tcc tta gac att Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile 820 825 830	2496
gat gta gga tgt aca gac tta aat gag gac cta ggt gta tgg gtg atc Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile 835 840 845	2544
ttt aag att aag acg caa gat ggg cac gca aga cta ggg aat cta gag Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu 850 855 860	2592
ttt ctc gaa gag aaa cca tta gta gga gaa gcg cta gct cgt gtg aaa Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys 865 870 875 880	2640
aga gcg gag aaa aaa tgg aga gac aaa cgt gaa aaa ttg gaa tgg gaa Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu 885 890 895	2688
aca aat atc gtt tat aaa gag gca aaa gaa tct gta gat gct tta ttt Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe 900 905 910	2736
gta aac tct caa tat gat caa tta caa gcg gat acg aat att gcc atg Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met 915 920 925	2784
att cat gcg gca gat aaa cgt gtt cat agc att cga gaa gct tat ctg Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu	2832

930	935	940	
cct gag ctg tct gtg att ccg ggt gtc aat gcg gct att ttt gaa gaa Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu 945 950 955 960			2880
tta gaa ggg cgt att ttc act gca ttc tcc cta tat gat gcg aga aat Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn 965 970 975			2928
gtc att aaa aat ggt gat ttt aat aat ggc tta tcc tgc tgg aac gtg Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val 980 985 990			2976
aaa ggg cat gta gat gta gaa gaa caa aac aac caa cgt tcg gtc ctt Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu 995 1000 1005			3024
gtt gtt ccg gaa tgg gaa gca gaa gtg tca caa gaa gtt cgt gtc Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val 1010 1015 1020			3069
tgt ccg ggt cgt ggc tat atc ctt cgt gtc aca gcg tac aag gag Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu 1025 1030 1035			3114
gga tat gga gaa ggt tgc gta acc att cat gag atc gag aac aat Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn 1040 1045 1050			3159
aca gac gaa ctg aag ttt agc aac tgc gta gaa gag gaa atc tat Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr 1055 1060 1065			3204
cca aat aac acg gta acg tgt aat gat tat act gta aat caa gaa Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu 1070 1075 1080			3249
gaa tac gga ggt gcg tac act tct cgt aat cga gga tat aac gaa Glu Tyr Gly Gly Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu 1085 1090 1095			3294
gct cct tcc gta cca gct gat tat gcg tca gtc tat gaa gaa aaa Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys 1100 1105 1110			3339
tcg tat aca gat gga cga aga gag aat cct tgt gaa ttt aac aga Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Phe Asn Arg 1115 1120 1125			3384
ggg tat agg gat tac acg cca cta cca gtt ggt tat gtg aca aaa Gly Tyr Arg Asp Tyr Thr Pro Leu Pro Val Gly Tyr Val Thr Lys 1130 1135 1140			3429
gaa tta gaa tac ttc cca gaa acc gat aag gta tgg att gag att Glu Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu Ile 1145 1150 1155			3474

gga gaa acg gaa gga aca ttt atc gtg gac agc gtg gaa tta ctc 3519  
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1160 1165 1170

ctt atg gag gaa tag 3534  
Leu Met Glu Glu  
1175

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<211> 1177  
<212> PRT  
<213> Artificial

<220>  
<223> Hybrid Delta-Endotoxin

<400> 26

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Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly  
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Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser  
35 40 45

Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile  
50 55 60

Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile  
65 70 75 80

Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala  
85 90 95

Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu  
100 105 110

Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu  
115 120 125

Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala  
130 135 140

Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val  
145 150 155 160

Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser  
165 170 175

Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg  
180 185 190

Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp His Ala Val  
195 200 205

Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg  
210 215 220

Asp Trp Ile Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val  
225 230 235 240

Leu Asp Ile Val Ser Leu Phe Pro Asn Tyr Asp Ser Arg Thr Tyr Pro  
245 250 255

Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val  
260 265 270

Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu  
275 280 285

Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr  
290 295 300

Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln  
305 310 315 320

Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro  
325 330 335

Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala  
340 345 350

Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg  
355 360 365

Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp  
370 375 380

Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val  
385 390 395 400

Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln  
405 410 415

Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His  
420 425 430

Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile  
435 440 445

Arg Ala Pro Met Phe Ser Trp Thr His Arg Ser Ala Thr Pro Thr Asn  
450 455 460

Thr Ile Asp Pro Glu Arg Ile Thr Gln Ile Pro Leu Val Lys Ala His  
465 470 475 480

Thr Leu Gln Ser Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly  
485 490 495

Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile  
500 505 510

Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg

515	520	525	
Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu			
530	535	540	
Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro			
545	550	555	560
Leu Thr Phe Gln Ser Phe Ser Tyr Ala Thr Ile Asn Thr Ala Phe Thr			
565	570	575	
Phe Pro Met Ser Gln Ser Ser Phe Thr Val Gly Ala Asp Thr Phe Ser			
580	585	590	
Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr			
595	600	605	
Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val			
610	615	620	
Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val			
625	630	635	640
Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser			
645	650	655	
Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys			
660	665	670	
His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn			
675	680	685	
Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr			
690	695	700	
Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val			
705	710	715	720
Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln			
725	730	735	
Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg			
740	745	750	
Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr			
755	760	765	
Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp			
770	775	780	
Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg			
785	790	795	800
Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg			
805	810	815	
Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile			
820	825	830	

Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile  
835 840 845

Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu  
850 855 860

Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys  
865 870 875 880

Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu  
885 890 895

Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe  
900 905 910

Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met  
915 920 925

Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu  
930 935 940

Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu  
945 950 955 960

Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn  
965 970 975

Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val  
980 985 990

Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu  
995 1000 1005

Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val  
1010 1015 1020

Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu  
1025 1030 1035

Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn  
1040 1045 1050

Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr  
1055 1060 1065

Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu  
1070 1075 1080

Glu Tyr Gly Gly Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu  
1085 1090 1095

Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys  
1100 1105 1110

Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Phe Asn Arg  
1115 1120 1125

Gly Tyr Arg Asp Tyr Thr Pro Leu Pro Val Gly Tyr Val Thr Lys  
1130 1135 1140

Glu Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu Ile  
1145 1150 1155

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Leu Met Glu Glu  
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<212> DNA

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1 5 10 15

agt aac cct gaa gta gaa tta ggt gga gaa aga ata gaa act ggt 96  
Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly  
20 25 30

tac acc cca atc gat att tcc ttg tcg cta acg caa ttt ctt ttg agt 144  
Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser  
35 40 45

gaa ttt gtt ccc ggt gct gga ttt gtg tta gga cta gtt gat ata ata 192  
Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile  
50 55 60

tgg gga att ttt ggt ccc tct caa tgg gac gca ttt ctt gta caa att 240  
Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile  
65 70 75 80

gaa cag tta att aac caa aga ata gaa gaa ttc gct agg aac caa gcc 288  
Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala  
85 90 95

att tct aga tta gaa gga cta agc aat ctt tat caa att tac gca gaa 336  
Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu  
100 105 110

tct ttt aga gag tgg gaa gca gat cct act aat cca gca tta aga gaa 384  
Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu  
115 120 125

gag atg cgt att caa ttc aat gac atg aac agt gcc ctt aca acc gct Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala 130 135 140	432
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tat gtt caa gct gca aat tta cat tta tca gtt ttg aga gat gtt tca Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser 165 170 175	528
gtg ttt gga caa agg tgg gga ttt gat gcc gcg act atc aat agt cgt Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg 180 185 190	576
tat aat gat tta act agg ctt att ggc aac tat aca gat tat gct gta Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val 195 200 205	624
cgc tgg tac aat acg gga tta gaa cgt gta tgg gga ccg gat tct aga Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg 210 215 220	672
gat tgg gta agg tat aat caa ttt aga aga gaa tta aca cta act gta Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val 225 230 235 240	720
tta gat atc gtt gct ctg ttc ccg aat tat gat agt aga aga tat cca Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro 245 250 255	768
att cga aca gtt tcc caa tta aca aga gaa att tat aca aac cca gta Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val 260 265 270	816
tta gaa aat ttt gat ggt agt ttt cga ggc tcg gct cag ggc ata gaa Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu 275 280 285	864
aga agt att agg agt cca cat ttg atg gat ata ctt aac agt ata acc Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr 290 295 300	912
atc tat acg gat gct cat agg ggt tat tat tat tgg tca ggg cat caa Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Trp Ser Gly His Gln 305 310 315 320	960
ata atg gct tct gta ggg ttt tcg ggg cca gaa ttc act ttt ccg Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro 325 330 335	1008
cta tat gga act atg gga aat gca gct cca caa cgt att gtt gct Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala 340 345 350	1056
caa cta ggt cag ggc gtg tat aga aca tta tcg tcc act tta tat aga	1104

Gln	Leu	Gly	Gln	Gly	Val	Tyr	Arg	Thr	Leu	Ser	Ser	Thr	Leu	Tyr	Arg	
355					360				365							
aga	cct	ttt	aat	ata	ggg	ata	aat	aat	caa	caa	cta	tct	gtt	ctt	gac	1152
Arg	Pro	Phe	Asn	Ile	Gly	Ile	Asn	Asn	Gln	Gln	Leu	Ser	Val	Leu	Asp	
370					375				380							
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Gly	Thr	Glu	Phe	Ala	Tyr	Gly	Thr	Ser	Ser	Asn	Leu	Pro	Ser	Ala	Val	
385					390				395						400	
tac	aga	aaa	agc	gga	acg	gta	gat	tcg	ctg	gat	gaa	ata	ccg	cca	cag	1248
Tyr	Arg	Lys	Ser	Gly	Thr	Val	Asp	Ser	Leu	Asp	Glu	Ile	Pro	Pro	Gln	
405					410				415							
aat	aac	aac	gtg	cca	cct	agg	caa	gga	ttt	agt	cat	cga	tta	agc	cat	1296
Asn	Asn	Asn	Val	Pro	Pro	Arg	Gln	Gly	Phe	Ser	His	Arg	Leu	Ser	His	
420					425				430							
gtt	tca	atg	ttt	cgt	tca	ggc	ttt	agt	aat	agt	agt	gta	agt	ata	ata	1344
Val	Ser	Met	Phe	Arg	Ser	Gly	Phe	Ser	Asn	Ser	Ser	Val	Ser	Ile	Ile	
435					440				445							
aga	gct	cct	atg	ttc	tct	tgg	ata	cat	cgt	agt	gct	gaa	ttt	aat	aat	1392
Arg	Ala	Pro	Met	Phe	Ser	Trp	Ile	His	Arg	Ser	Ala	Glu	Phe	Asn	Asn	
450					455				460							
ata	att	gca	tcg	gat	agt	att	act	caa	ata	cca	ttg	gta	aaa	gca	cat	1440
Ile	Ile	Ala	Ser	Asp	Ser	Ile	Thr	Gln	Ile	Pro	Leu	Val	Lys	Ala	His	
465					470				475						480	
aca	ctt	cag	tca	ggt	act	act	gtt	gta	aga	ggg	ccc	ggg	ttt	acg	gga	1488
Thr	Leu	Gln	Ser	Gly	Thr	Val	Val	Arg	Gly	Pro	Gly	Phe	Thr	Gly		
					485				490						495	
gga	gat	att	ctt	cga	cga	aca	agt	gga	gga	cca	ttt	gct	tat	act	att	1536
Gly	Asp	Ile	Leu	Arg	Arg	Thr	Ser	Gly	Gly	Pro	Phe	Ala	Tyr	Thr	Ile	
					500				505						510	
gtt	aat	ata	aat	ggg	caa	tta	ccc	caa	agg	tat	cgt	gca	aga	ata	cgc	1584
Val	Asn	Ile	Asn	Gly	Gln	Leu	Pro	Gln	Arg	Tyr	Arg	Ala	Arg	Ile	Arg	
					515				520						525	
tat	gcc	tct	act	aca	aat	cta	aga	att	tac	gta	acg	gtt	gca	ggt	gaa	1632
Tyr	Ala	Ser	Thr	Thr	Asn	Leu	Arg	Ile	Tyr	Val	Thr	Val	Ala	Gly	Glu	
					530				535						540	
cgg	att	ttt	gct	ggt	caa	ttt	aac	aaa	aca	atg	gat	acc	ggt	gac	cca	1680
Arg	Ile	Phe	Ala	Gly	Gln	Phe	Asn	Lys	Thr	Met	Asp	Thr	Gly	Asp	Pro	
					545				550						560	
tta	aca	ttc	caa	tct	ttt	agt	tac	gca	act	att	aat	aca	gct	ttt	aca	1728
Leu	Thr	Phe	Gln	Ser	Phe	Ser	Tyr	Ala	Thr	Ile	Asn	Thr	Ala	Phe	Thr	
					565				570						575	
ttc	cca	atg	agc	cag	agt	agt	ttc	aca	gta	ggt	gct	gat	act	ttt	agt	1776
Phe	Pro	Met	Ser	Gln	Ser	Ser	Phe	Thr	Val	Gly	Ala	Asp	Thr	Phe	Ser	
					580				585						590	

tca ggg aat gaa gtt tat ata gac aga ttt gaa ttg att cca gtt act Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr 595 600 605	1824
gca aca ttt gaa gca gaa tat gat tta gaa aga gca caa aag gcg gtg Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val 610 615 620	1872
aat gcg ctg ttt act tct ata aac caa ata ggg ata aaa aca gat gtg Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val 625 630 635 640	1920
acg gat tat cat att gat caa gta tcc aat tta gtg gat tgt tta tca Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser 645 650 655	1968
gat gaa ttt tgt ctg gat gaa aag cga gaa ttg tcc gag aaa gtc aaa Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys 660 665 670	2016
cat gcg aag cga ctc agt gat gag cgg aat tta ctt caa gat cca aac His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn 675 680 685	2064
ttc aaa ggc atc aat agg caa cta gac cgt ggt tgg aga gga agt acg Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr 690 695 700	2112
gat att acc atc caa aga gga gat gac gta ttc aaa gaa aat tat gtc Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val 705 710 715 720	2160
aca cta cca ggt acc ttt gat gag tgc tat cca aca tat ttg tat caa Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln 725 730 735	2208
aaa atc gat gaa tca aaa tta aaa gcc ttt acc cgt tat caa tta aga Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg 740 745 750	2256
ggg tat atc gaa gat agt caa gac tta gaa atc tat tta att cgc tac Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr 755 760 765	2304
aat gca aaa cat gaa aca gta aat gtg cca ggt acg ggt tcc tta tgg Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp 770 775 780	2352
ccg ctt tca gcc caa agt cca atc gga aag tgt gga gag ccg aat cga Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg 785 790 795 800	2400
tgc gcg cca cac ctt gaa tgg aat cct gac tta gat tgt tcg tgt agg Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg 805 810 815	2448
gat gga gaa aag tgt gcc cat cat tcg cat cat ttc tcc tta gac att	2496

Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile			
820	825	830	
gat gta gga tgt aca gac tta aat gag gac cta ggt gta tgg gtg atc			2544
Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile			
835	840	845	
ttt aag att aag acg caa gat ggg cac gca aga cta ggg aat cta gag			2592
Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu			
850	855	860	
ttt ctc gaa gag aaa cca tta gta gga gaa gcg cta gct cgt gtg aaa			2640
Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys			
865	870	875	880
aga gcg gag aaa aaa tgg aga gac aaa cgt gaa aaa ttg gaa tgg gaa			2688
Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu			
885	890	895	
aca aat atc gtt tat aaa gag gca aaa gaa tct gta gat gct tta ttt			2736
Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe			
900	905	910	
gta aac tct caa tat gat caa tta caa gcg gat acg aat att gcc atg			2784
Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met			
915	920	925	
att cat gcg gca gat aaa cgt gtt cat agc att cga gaa gct tat ctg			2832
Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu			
930	935	940	
cct gag ctg tct gtg att ccg ggt gtc aat gcg gct att ttt gaa gaa			2880
Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu			
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Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn			
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gtc att aaa aat ggt gat ttt aat aat ggc tta tcc tgc tgg aac gtg			2976
Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val			
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aaa ggg cat gta gat gta gaa gaa caa aac aac caa cgt tcg gtc ctt			3024
Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu			
995	1000	1005	
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Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val			
1010	1015	1020	
tgt ccg ggt cgt ggc tat atc ctt cgt gtc aca gcg tac aag gag			3114
Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu			
1025	1030	1035	
gga tat gga gaa ggt tgc gta acc att cat gag atc gag aac aat			3159
Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn			
1040	1045	1050	

aca gac gaa ctg aag ttt agc aac tgc gta gaa gag gaa atc tat	3204
Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Ile Tyr	
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cca aat aac acg gta acg tgt aat gat tat act gta aat caa gaa	3249
Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu	
1070 1075 1080	
gaa tac gga ggt gcg tac act tct cgt aat cga gga tat aac gaa	3294
Glu Tyr Gly Gly Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu	
1085 1090 1095	
gct cct tcc gta cca gct gat tat gcg tca gtc tat gaa gaa aaa	3339
Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys	
1100 1105 1110	
tcg tat aca gat gga cga aga gag aat cct tgt gaa ttt aac aga	3384
Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Phe Asn Arg	
1115 1120 1125	
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Gly Tyr Arg Asp Tyr Thr Pro Leu Pro Val Gly Tyr Val Thr Lys	
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gaa tta gaa tac ttc cca gaa acc gat aag gta tgg att gag att	3474
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1145 1150 1155	
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Leu Met Glu Glu	
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Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser	
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Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile	

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Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile			
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Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala			
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Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu			
100	105	110	
Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu			
115	120	125	
Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala			
130	135	140	
Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val			
145	150	155	160
Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser			
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Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg			
180	185	190	
Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val			
195	200	205	
Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg			
210	215	220	
Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val			
225	230	235	240
Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro			
245	250	255	
Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val			
260	265	270	
Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu			
275	280	285	
Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr			
290	295	300	
Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Trp Ser Gly His Gln			
305	310	315	320
Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro			
325	330	335	
Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala			
340	345	350	
Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg			
355	360	365	

Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp  
370 375 380

Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val  
385 390 395 400

Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln  
405 410 415

Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His  
420 425 430

Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile  
435 440 445

Arg Ala Pro Met Phe Ser Trp Ile His Arg Ser Ala Glu Phe Asn Asn  
450 455 460

Ile Ile Ala Ser Asp Ser Ile Thr Gln Ile Pro Leu Val Lys Ala His  
465 470 475 480

Thr Leu Gln Ser Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly  
485 490 495

Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile  
500 505 510

Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg  
515 520 525

Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu  
530 535 540

Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro  
545 550 555 560

Leu Thr Phe Gln Ser Phe Ser Tyr Ala Thr Ile Asn Thr Ala Phe Thr  
565 570 575

Phe Pro Met Ser Gln Ser Ser Phe Thr Val Gly Ala Asp Thr Phe Ser  
580 585 590

Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr  
595 600 605

Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val  
610 615 620

Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val  
625 630 635 640

Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser  
645 650 655

Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys  
660 665 670

His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn			
675	680	685	
Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr			
690	695	700	
Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val			
705	710	715	720
Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln			
725	730	735	
Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg			
740	745	750	
Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr			
755	760	765	
Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp			
770	775	780	
Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg			
785	790	795	800
Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg			
805	810	815	
Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile			
820	825	830	
Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile			
835	840	845	
Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu			
850	855	860	
Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys			
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Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu			
885	890	895	
Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe			
900	905	910	
Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met			
915	920	925	
Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu			
930	935	940	
Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu			
945	950	955	960
Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn			
965	970	975	
Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val			

980	985	990													
Lys	Gly	His	Val	Asp	Val	Glu	Glu	Gln	Asn	Asn	Gln	Arg	Ser	Val	Leu
995						1000						1005			
Val	Val	Pro	Glu	Trp	Glu	Ala	Glu	Val	Ser	Gln	Glu	Val	Arg	Val	
1010						1015						1020			
Cys	Pro	Gly	Arg	Gly	Tyr	Ile	Leu	Arg	Val	Thr	Ala	Tyr	Lys	Glu	
1025						1030						1035			
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Thr	Asp	Glu	Leu	Lys	Phe	Ser	Asn	Cys	Val	Glu	Glu	Glu	Ile	Tyr	
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Pro	Asn	Asn	Thr	Val	Thr	Cys	Asn	Asp	Tyr	Thr	Val	Asn	Gln	Glu	
1070						1075						1080			
Glu	Tyr	Gly	Gly	Ala	Tyr	Thr	Ser	Arg	Asn	Arg	Gly	Tyr	Asn	Glu	
1085						1090						1095			
Ala	Pro	Ser	Val	Pro	Ala	Asp	Tyr	Ala	Ser	Val	Tyr	Glu	Glu	Lys	
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Ser	Tyr	Thr	Asp	Gly	Arg	Arg	Glu	Asn	Pro	Cys	Glu	Phe	Asn	Arg	
1115						1120						1125			
Gly	Tyr	Arg	Asp	Tyr	Thr	Pro	Leu	Pro	Val	Gly	Tyr	Val	Thr	Lys	
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tacacttctc gtaatcaagg atatgacgaa gcctatggta ataacccttc cgtaccagct	3360
gattacgctt cagtctatga agaaaaatcg tatacagatg gacgaagaga gaatccttgt	3420
gaatctaaca gaggctatgg ggattacaca ccactaccgg ctggttatgt aacaaaggat	3480
ttagagtact tcccagagac cgataaggta tggattgaga tcggagaaac agaaggaaca	3540
ttcatcgtgg atagcgtgga attactccctt atggaggaa	3579

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<211> 1193

<212> PRT  
<213> Artificial

<220>  
<223> Hybrid Delta-Endotoxin

<400> 30

Met Asp Asn Asn Pro Asn Ile Asn Glu Cys Ile Pro Tyr Asn Cys Leu  
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Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly  
20 25 30

Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser  
35 40 45

Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile  
50 55 60

Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile  
65 70 75 80

Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala  
85 90 95

Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu  
100 105 110

Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu  
115 120 125

Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala  
130 135 140

Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val  
145 150 155 160

Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser  
165 170 175

Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg  
180 185 190

Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val  
195 200 205

Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg  
210 215 220

Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val  
225 230 235 240

Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro  
245 250 255

Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val  
260 265 270

Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu  
275 280 285

Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr  
290 295 300

Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Trp Ser Gly His Gln  
305 310 315 320

Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro  
325 330 335

Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala  
340 345 350

Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg  
355 360 365

Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp  
370 375 380

Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val  
385 390 395 400

Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln  
405 410 415

Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His  
420 425 430

Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile  
435 440 445

Arg Ala Pro Met Phe Ser Trp Ile His Arg Ser Ala Thr Leu Thr Asn  
450 455 460

Thr Ile Asp Pro Glu Arg Ile Asn Gln Ile Pro Leu Val Lys Gly Phe  
465 470 475 480

Arg Val Trp Gly Gly Thr Ser Val Ile Thr Gly Pro Gly Phe Thr Gly  
485 490 495

Gly Asp Ile Leu Arg Arg Asn Thr Phe Gly Asp Phe Val Ser Leu Gln  
500 505 510

Val Asn Ile Asn Ser Pro Ile Thr Gln Arg Tyr Arg Leu Arg Phe Arg  
515 520 525

Tyr Ala Ser Ser Arg Asp Ala Arg Val Ile Val Leu Thr Gly Ala Ala  
530 535 540

Ser Thr Gly Val Gly Gly Gln Val Ser Val Asn Met Pro Leu Gln Lys  
545 550 555 560

Thr Met Glu Ile Gly Glu Asn Leu Thr Ser Arg Thr Phe Arg Tyr Thr  
565 570 575

Asp Phe Ser Asn Pro Phe Ser Phe Arg Ala Asn Pro Asp Ile Ile Gly  
580 585 590

Ile Ser Glu Gln Pro Leu Phe Gly Ala Gly Ser Ile Ser Ser Gly Glu  
595 600 605

Leu Tyr Ile Asp Lys Ile Glu Ile Ile Leu Ala Asp Ala Thr Phe Glu  
610 615 620

Ala Glu Ser Asp Leu Glu Arg Ala Gln Lys Ala Val Asn Ala Leu Phe  
625 630 635 640

Thr Ser Ser Asn Gln Ile Gly Leu Lys Thr Asp Val Thr Asp Tyr His  
645 650 655

Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser Asp Glu Phe Cys  
660 665 670

Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys His Ala Lys Arg  
675 680 685

Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn Phe Arg Gly Ile  
690 695 700

Asn Arg Gln Pro Asp Arg Gly Trp Arg Gly Ser Thr Asp Ile Thr Ile  
705 710 715 720

Gln Gly Gly Asp Asp Val Phe Lys Glu Asn Tyr Val Thr Leu Pro Gly  
725 730 735

Thr Val Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln Lys Ile Asp Glu  
740 745 750

Ser Lys Leu Lys Ala Tyr Thr Arg Tyr Glu Leu Arg Gly Tyr Ile Glu  
755 760 765

Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr Asn Ala Lys His  
770 775 780

Glu Ile Val Asn Val Pro Gly Thr Gly Ser Leu Trp Pro Leu Ser Ala  
785 790 795 800

Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg Cys Ala Pro His  
805 810 815

Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg Asp Gly Glu Lys  
820 825 830

Cys Ala His His Ser His His Phe Thr Leu Asp Ile Asp Val Gly Cys  
835 840 845

Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile Phe Lys Ile Lys  
850 855 860

Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu Phe Leu Glu Glu  
865 870 875 880

Lys Pro Leu Leu Gly Glu Ala Leu Ala Arg Val Lys Arg Ala Glu Lys

885	890	895
Lys Trp Arg Asp Lys Arg Glu Lys Leu Gln Leu Glu Thr Asn Ile Val		
900	905	910
Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe Val Asn Ser Gln		
915	920	925
Tyr Asp Arg Leu Gln Val Asp Thr Asn Ile Ala Met Ile His Ala Ala		
930	935	940
Asp Lys Arg Val His Arg Ile Arg Glu Ala Tyr Leu Pro Glu Leu Ser		
945	950	955
Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu Leu Glu Gly Arg		
965	970	975
Ile Phe Thr Ala Tyr Ser Leu Tyr Asp Ala Arg Asn Val Ile Lys Asn		
980	985	990
Gly Asp Phe Asn Asn Gly Leu Leu Cys Trp Asn Val Lys Gly His Val		
995	1000	1005
Asp Val Glu Glu Gln Asn Asn His Arg Ser Val Leu Val Ile Pro		
1010	1015	1020
Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val Cys Pro Gly		
1025	1030	1035
Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu Gly Tyr Gly		
1040	1045	1050
Glu Gly Cys Val Thr Ile His Glu Ile Glu Asp Asn Thr Asp Glu		
1055	1060	1065
Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Val Tyr Pro Asn Asn		
1070	1075	1080
Thr Val Thr Cys Asn Asn Tyr Thr Gly Thr Gln Glu Glu Tyr Glu		
1085	1090	1095
Gly Thr Tyr Thr Ser Arg Asn Gln Gly Tyr Asp Glu Ala Tyr Gly		
1100	1105	1110
Asn Asn Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu		
1115	1120	1125
Lys Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Ser Asn		
1130	1135	1140
Arg Gly Tyr Gly Asp Tyr Thr Pro Leu Pro Ala Gly Tyr Val Thr		
1145	1150	1155
Lys Asp Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu		
1160	1165	1170
Ile Gly Glu Thr Glu Gly Thr Phe Ile Val Asp Ser Val Glu Leu		
1175	1180	1185

Leu Leu Met Glu Glu  
1190

<210> 31  
<211> 16  
<212> DNA  
<213> Artificial  
  
<220>  
<223> Synthetic Oligonucleotide  
  
<400> 31  
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<210> 32  
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<212> DNA  
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<223> Synthetic Oligonucleotide  
  
<400> 32  
tcaaataccca ttggtaaaag 20  
  
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<212> DNA  
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<220>  
<223> Hybrid Delta-Endotoxin  
  
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tcgctaacgc aatttctttt gagtgaattt gttccgggtg ctggatttgt gttaggacta 120  
gttgatataa tatgggaat ttttgtccc tctcaatggg acgcatttct tgtacaaatt  
gaacagttaa ttaacccaaag aatagaagaa ttcgctagga accaaggccat ttcttagatta 180  
gaaggactaa gcaatctta tcaaatttac gcagaatctt ttagagagtg ggaaggcagat  
cctactaatc cagcattaag agaagagatg cgtattcaat tcaatgacat gaacagtgcc 240  
cttacaaccg ctattcctct tttgcagtt caaaatttac aagttcctct tttatcagta  
tatgttcaag ctgcaaattt acatttatca gtttgagag atgttcagt gtttggacaa 300  
aggtggggat ttgatgccgc gactatcaat agtcgttata atgatttaac taggcttatt 360  
420  
480  
540  
600

ggcaactata cagattatgc tgtacgctgg tacaatacgg gattagaacg tgtatgggg	660
ccggattcta gagattgggt aaggtaataat caatttagaa gagaattaac actaactgt	720
ttagatatcg ttgctctgtt cccgaattat gatagtagaa gatatccaa tcgaacagtt	780
tcccaattaa caagagaaat ttatacaaac ccagtattag aaaatttga tggtagttt	840
cgaggctcg cgctcaggcat agaaagaagt attaggagtc cacattgtat ggatataactt	900
aacagtataa ccatctatac ggatgctcat aggggttatt attattggtc agggcatcaa	960
ataatggctt ctcctgttagg gtttccggg ccagaattca ctttccgct atatgaaact	1020
atggaaatg cagctccaca acaacgtatt gttgctcaac taggtcaggg cgtgtataga	1080
acattatcg tccacttata tagaagacct tttaatatacg ggataaataa tcaacaacta	1140
tctgttcttg acgggacaga atttgcttat ggaacctcct caaatttgc atccgctgt	1200
tacagaaaaa gcggAACGGT agattcgctg gatgaaatac cgccacagaa taacaacgt	1260
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gaatttaata atataattgc atcgatagt attactcaa taccatttgtt aaaagcacat	1440
acacttcagt caggtactac tggtaaga gggcccggt ttacggagg agatattctt	1500
cgacgaacaa gtggaggacc atttgcttat actattgtta atataaatgg gcaattaccc	1560
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cagaaggcgg tgaatgcgt gtttacgtt acaaaccac tagggctaaa aacaaatgt	1920
acggattatc atattgatca agtgtccaaat ttagttacgt atttatcgga tgaattttgt	1980
ctggatgaaa agcgagaatt gtccgagaaa gtcaaacatg cgaagcact cagtgatgaa	2040
cgcaatttac tccaagattc aaatttcaaa gacattaata ggcaaccaga acgtgggtgg	2100
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tcaaaaattaa aagcctttac ccgttatcaa ttaagagggt atatcgaa tagtcaagac	2280
ttagaaatct atttaattcg ctacaatgca aaacatgaaa cagtaaatgt gccaggtacg	2340

ggtccttat ggccgcttc agcccaaagt ccaatcgaa agtgtggaga gccgaatcga	2400
tgcgcgccac accttgaatg gaatcctgac tttagattgtt cgtgttaggaa tggagaaaag	2460
tgtccccatc attcgcatca tttctcctta gacattgatg taggatgtac agacttaat	2520
gaggacctag gtgtatgggt gatcttaag attaagacgc aagatggca cgcaagacta	2580
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caagcggata cgaatattgc catgattcat gcggcagata aacgtgtca tagcattcgaa	2820
gaagcttatac tgcctgagct gtctgtgatt ccgggtgtca atgcggctat ttttgaagaa	2880
ttagaagggc gtatttcac tgcattctcc ctatatgatg cgagaaatgt cattaaaaat	2940
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gttcgtgtct gtccgggtcg tggctatatc cttcggtca cagcgtacaa ggagggatata	3120
ggagaagggtt gcgttaaccat tcatgagatc gagaacaata cagacgaact gaagtttagc	3180
aactgcgtag aagaggaaat ctatccaaat aacacggtaa cgtgtaatga ttatactgtaa	3240
aatcaagaag aatacggagg tgcgtacact tctcgtaatc gaggatataa cgaagctcct	3300
tccgtaccag ctgattatgc gtcagtctat gaagaaaaat cgtatacaga tggacgaaga	3360
gagaatcctt gtgaatttaa cagagggtat agggattaca cgccactacc agttggttat	3420
gtgacaaaag aattagaata cttcccagaa accgataagg tatggattga gattggagaa	3480
acggaaggaa catttacgt ggacagcgtg gaattactcc ttatggagga atag	3534

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 <211> 1177  
 <212> PRT  
 <213> Artificial

<220>  
 <223> Hybrid Delta-Endotoxin

<400> 34

Met Asp Asn Asn Pro Asn Ile Asn Glu Cys Ile Pro Tyr Asn Cys Leu  
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Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly  
 20 25 30

Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser

35	40	45	
Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile			
50	55	60	
Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile			
65	70	75	80
Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala			
85	90	95	
Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu			
100	105	110	
Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu			
115	120	125	
Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala			
130	135	140	
Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val			
145	150	155	160
Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser			
165	170	175	
Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg			
180	185	190	
Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val			
195	200	205	
Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg			
210	215	220	
Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val			
225	230	235	240
Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro			
245	250	255	
Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val			
260	265	270	
Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu			
275	280	285	
Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr			
290	295	300	
Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln			
305	310	315	320
Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro			
325	330	335	
Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala			
340	345	350	

Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg  
355 360 365

Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp  
370 375 380

Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val  
385 390 395 400

Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln  
405 410 415

Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His  
420 425 430

Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile  
435 440 445

Arg Ala Pro Met Phe Ser Trp Ile His Arg Ser Ala Glu Phe Asn Asn  
450 455 460

Ile Ile Ala Ser Asp Ser Ile Thr Gln Ile Pro Leu Val Lys Ala His  
465 470 475 480

Thr Leu Gln Ser Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly  
485 490 495

Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile  
500 505 510

Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg  
515 520 525

Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu  
530 535 540

Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro  
545 550 555 560

Leu Thr Phe Gln Ser Phe Ser Tyr Ala Thr Ile Asn Thr Ala Phe Thr  
565 570 575

Phe Pro Met Ser Gln Ser Ser Phe Thr Val Gly Ala Asp Thr Phe Ser  
580 585 590

Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr  
595 600 605

Ala Thr Leu Glu Ala Glu Tyr Asn Leu Glu Arg Ala Gln Lys Ala Val  
610 615 620

Asn Ala Leu Phe Thr Ser Thr Asn Gln Leu Gly Leu Lys Thr Asn Val  
625 630 635 640

Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Thr Tyr Leu Ser  
645 650 655

Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys  
 660 665 670

His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Ser Asn  
 675 680 685

Phe Lys Asp Ile Asn Arg Gln Pro Glu Arg Gly Trp Gly Gly Ser Thr  
 690 695 700

Gly Ile Thr Ile Gln Gly Gly Asp Asp Val Phe Lys Glu Asn Tyr Val  
 705 710 715 720

Thr Leu Ser Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln  
 725 730 735

Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg  
 740 745 750

Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr  
 755 760 765

Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp  
 770 775 780

Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg  
 785 790 795 800

Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg  
 805 810 815

Asp Gly Glu Lys Cys Ala His His Ser His Phe Ser Leu Asp Ile  
 820 825 830

Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile  
 835 840 845

Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu  
 850 855 860

Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys  
 865 870 875 880

Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu  
 885 890 895

Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe  
 900 905 910

Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met  
 915 920 925

Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu  
 930 935 940

Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu  
 945 950 955 960

Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn

	965	970	975
Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val			
980	985	990	
Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu			
995	1000	1005	
Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val			
1010	1015	1020	
Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu			
1025	1030	1035	
Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn			
1040	1045	1050	
Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr			
1055	1060	1065	
Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu			
1070	1075	1080	
Glu Tyr Gly Gly Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu			
1085	1090	1095	
Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys			
1100	1105	1110	
Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Phe Asn Arg			
1115	1120	1125	
Gly Tyr Arg Asp Tyr Thr Pro Leu Pro Val Gly Tyr Val Thr Lys			
1130	1135	1140	
Glu Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu Ile			
1145	1150	1155	
Gly Glu Thr Glu Gly Thr Phe Ile Val Asp Ser Val Glu Leu Leu			
1160	1165	1170	
Leu Met Glu Glu			
1175			
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